What is claimed is:

220. An artificial antigen presenting cell comprising:

a) liposome components;

b) MHC components;

c) antigen components;

d) accessory molecule components, wherein said antigen components are in contact with at least said MHC components, and;

e) molecules for orienting molecules of interest, said molecules of interest selected from the group consisting of said MHC, antigen, and accessory molecule components, said molecules for orienting further in contact with at least said liposome components.

221. An artificial antigen presenting cell according to claim 220 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

222. An artificial antigen presenting cell according to claim 221 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

223. An artificial antigen presenting cell according to claim 222 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, antigen components, MHC components, and accessory components.

224. An artificial antigen presenting cell according to claim 223 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

225. An artificial antigen presenting cell according to claim 222 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived

antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

226. An artificial antigen presenting cell according to claim 222 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

227. An artificial antigen presenting cell according to claim 222 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

228. An artificial antigen presenting cell according to claim 222 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin $\beta$ subunit.

229. An artificial antigen presenting cell according to claim 220 further comprising molecular components selected from the group consisting of co-stimulatory molecule components, adhesion molecule components, cell modulation molecule components, irrelevant molecule components for binding said artificial presenting cell to a solid support or binding a label, and label components.

230. An artificial antigen presenting cell according to claim 229 wherein said molecules of interest further selected from the group consisting of said molecular components of claim 229.

231. An artificial antigen presenting cell according to claim 230 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

232. An artificial antigen presenting cell according to claim 231 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

233. An artificial antigen presenting cell according to claim 232 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory molecule components, said adhesion molecule components, said cell modulation molecule components, said molecules for orienting, said irrelevant molecule components and said accessory components.

234. An artificial antigen presenting cell according to claim 233 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

235. An artificial antigen presenting cell according to claim 232 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

236. An artificial antigen presenting cell according to claim 235 wherein said molecules of interest contact at least one of said molecules for orienting of claim 235.

237. An artificial antigen presenting cell according to claim 232 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

238. An artificial antigen presenting cell according to claim 232 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an α1 and α2 subunit set of a Class I

MHC, an α1 and β subunit set of a Class II MHC, a peptide derived from said α and β subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

239. An artificial antigen presenting cell according to claim 232 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to the ligands of the foregoing molecules.

240. An artificial antigen presenting cell according to claim 232 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

241. An artificial antigen presenting cell according to claim 232 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

242. An artificial antigen presenting cell according to claim 232 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

243. An artificial antigen presenting cell according to 233 wherein said irrelevant molecule components, have a chemical moiety for binding a solid support either directly or through an intermediate molecule, or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

244. An artificial antigen presenting cell according to claim 243 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture

molecules further having the capacity to bind specifically to said irrelevant molecule components.

245. An artificial antigen presenting cell according to claim 244 wherein said capture molecules are noncovalently bound to said lipid.

246. An artificial antigen presenting cell comprising:

a) liposome components;

b) MHC components;

c) antigen components,

d) accessory molecule components;

e) co-stimulatory molecule components, wherein said antigen components are in contact with at least said MHC components, and;

f) molecules for orienting molecules of interest, said molecules of interest selected from said MHC, antigen, accessory molecule, and said co-stimulatory molecule components, said molecules for orienting further in contact with at least said liposome components.

247. An artificial antigen presenting cell according to claim 246 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

248. An artificial antigen presenting cell according to claim 247 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

249. An artificial antigen presenting cell according to claim 248 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory components, and said accessory components.

250. An artificial antigen presenting cell according to claim 249 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

251. An artificial antigen presenting cell according to claim 248 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

252. An artificial antigen presenting cell according to claim 248 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

253. An artificial antigen presenting cell according to claim 248 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

254. An artificial antigen presenting cell according to claim 248 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

255. An artificial antigen presenting cell according to claim 248 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin $\beta$ subunit.

256. An artificial antigen presenting cell according to claim 246 further comprising molecular components selected from the group consisting of adhesion molecule components, cell modulation molecule components, irrelevant molecule components for binding said artificial presenting cell to a solid support or binding a label, and label components.

257. An artificial antigen presenting cell according to claim 256 wherein said molecules of interest further selected from the group consisting of said molecular components of claim 256.

258. An artificial antigen presenting cell according to claim 257 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

259. An artificial antigen presenting cell according to claim 258 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

260. An artificial antigen presenting cell according to claim 259 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory molecule components, said adhesion molecule components, said cell modulation molecule components, said molecules for orienting, said irrelevant molecule components and said accessory components.

261. An artificial antigen presenting cell according to claim 260 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

262. An artificial antigen presenting cell according to claim 259 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

263. An artificial antigen presenting cell according to claim 262 wherein said molecules of interest contact at least one of said molecules for orienting of claim 262.

264. An artificial antigen presenting cell according to claim 259 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

265. An artificial antigen presenting cell according to claim 259 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

266. An artificial antigen presenting cell according to claim 259 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

267. An artificial antigen presenting cell according to claim 259 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

268. An artificial antigen presenting cell according to claim 259 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

269. An artificial antigen presenting cell according to claim 259 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1,

CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

270. An artificial antigen presenting cell according to 259 wherein said irrelevant molecule components, have a chemical moiety for binding a solid support either directly or through an intermediate molecule, or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

271. An artificial antigen presenting cell according to claim 270 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture molecules further having the capacity to bind specifically to said irrelevant molecule components.

272. An artificial antigen presenting cell according to claim 271 wherein said capture molecules are noncovalently bound to said lipid.

273. An artificial antigen presenting cell comprising:

a) liposome components;

b) MHC components;

c) antigen components,

d) accessory molecule components;

e) cell modulation molecule components, wherein said antigen components are in contact with at least said MHC components, and;

f) molecules for orienting molecules of interest, said molecules of interest selected from said MHC, antigen, accessory molecule, and cell modulation molecule components, said molecules for orienting further in contact with at least said liposome components.

274. An artificial antigen presenting cell according to claim 273 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

275. An artificial antigen presenting cell according to claim 274 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

276. An artificial antigen presenting cell according to claim 275 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said cell modulatory components, and said accessory components.

277. An artificial antigen presenting cell according to claim 276 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

278. An artificial antigen presenting cell according to claim 275 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

279. An artificial antigen presenting cell according to claim 275 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

280. An artificial antigen presenting cell according to claim 275 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to the ligands of the foregoing molecules.

281. An artificial antigen presenting cell according to claim 275 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

282. An artificial antigen presenting cell according to claim 275 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

283. An artificial antigen presenting cell according to claim 273 further comprising molecular components selected from the group consisting of adhesion molecule components, co-stimulatory molecule components, irrelevant molecule components for binding said artificial presenting cell to a solid support or binding a label, and label components.

284. An artificial antigen presenting cell according to claim 283 wherein said molecules of interest further selected from the group consisting of said molecular components of claim 283.

285. An artificial antigen presenting cell according to claim 284 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

286. An artificial antigen presenting cell according to claim 285 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

287. An artificial antigen presenting cell according to claim 286 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components,

said antigen components, said MHC components, said co-stimulatory molecule components, said adhesion molecule components, said cell modulation molecule components, said molecules for orienting, said irrelevant molecule components and said accessory components.

288. An artificial antigen presenting cell according to claim 287 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

289. An artificial antigen presenting cell according to claim 286 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

290. An artificial antigen presenting cell according to claim 289 wherein said molecules of interest contact at least one of said molecules for orienting of claim 289.

291. An artificial antigen presenting cell according to claim 286 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

292. An artificial antigen presenting cell according to claim 286 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an α1 and α2 subunit set of a Class I MHC, an α1 and β subunit set of a Class II MHC, a peptide derived from said α and β subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

293. An artificial antigen presenting cell according to claim 286 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18,

CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

294. An artificial antigen presenting cell according to claim 286 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

295. An artificial antigen presenting cell according to claim 286 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

296. An artificial antigen presenting cell according to claim 286 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

297. An artificial antigen presenting cell according to 286 wherein said irrelevant molecule components, have a chemical moiety for binding a solid support either directly or through an intermediate molecule, or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

298. An artificial antigen presenting cell according to claim 297 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture molecules further having the capacity to bind specifically to said irrelevant molecule components.

299. An artificial antigen presenting cell according to claim 298 wherein said capture molecules are noncovalently bound to said lipid.

300. An artificial antigen presenting cell comprising:

a) liposome components;

b) MHC components;

c) antigen components,

d) accessory molecule components,

e) co-stimulatory molecule components;

f) cell modulation molecule components, wherein said antigen components are in contact with at least said MHC components, and;

g) molecules for orienting molecules of interest, said molecules of interest selected from said MHC, antigen, accessory molecule, co-stimulatory molecule, and cell modulation molecule components, said molecules for orienting further in contact with at least said liposome components.

301. An artificial antigen presenting cell according to claim 300 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

302. An artificial antigen presenting cell according to claim 301 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

303. An artificial antigen presenting cell according to claim 302 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory components, said cell modulation molecule components, and said accessory components.

304. An artificial antigen presenting cell according to claim 303 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

305. An artificial antigen presenting cell according to claim 302 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

306. An artificial antigen presenting cell according to claim 302 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

307. An artificial antigen presenting cell according to claim 302 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

308. An artificial antigen presenting cell according to claim 302 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

309. An artificial antigen presenting cell according to claim 302 wherein said cell modulation molecule components are selected from the group consisting of a cytokine, a chemokind, CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

310. An artificial antigen presenting cell according to claim 302 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin $\beta$ subunit.

311. An artificial antigen presenting cell according to claim 300 further comprising molecular components selected from the group consisting of adhesion molecule components, irrelevant molecule components for binding said artificial presenting cell to a solid support or binding a label, and label components.

312. An artificial antigen presenting cell according to claim 311 wherein said molecules of interest further selected from the group consisting of said molecular components of claim 311.

313. An artificial antigen presenting cell according to claim 312 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

314. An artificial antigen presenting cell according to claim 313 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

315. An artificial antigen presenting cell according to claim 314 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory molecule components, said adhesion molecule components, said cell modulation molecule components, said molecules for orienting, said irrelevant molecule components and said accessory components.

316. An artificial antigen presenting cell according to claim 315 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

317. An artificial antigen presenting cell according to claim 314 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

318. An artificial antigen presenting cell according to claim 317 wherein said molecules of interest contact at least one of said molecules for orienting of claim 317.

319. An artificial antigen presenting cell according to claim 314 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

320. An artificial antigen presenting cell according to claim 314 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

321. An artificial antigen presenting cell according to claim 314 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

322. An artificial antigen presenting cell according to claim 314 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

323. An artificial antigen presenting cell according to claim 314 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

324. An artificial antigen presenting cell according to claim 314 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

325. An artificial antigen presenting cell according to 314 wherein said irrelevant molecule components, have a chemical moiety for binding a solid support either directly or through an intermediate molecule, or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

326. An artificial antigen presenting cell according to claim 325 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture molecules further having the capacity to bind specifically to said irrelevant molecule components.

327. An artificial antigen presenting cell according to claim 326 wherein said capture molecules are noncovalently bound to said lipid.

328. An artificial antigen presenting cell comprising:

a) liposome components;

b) MHC components;

c) antigen components;

d) accessory molecule components;

e) co-stimulatory molecule components;

f) cell modulation molecule components;

g) adhesion molecule components;

h) irrelevant molecule components;

i) cholesterol components, wherein said antigen components are in contact with at least said MHC components, and;

j) molecules for orienting molecules of interest, said molecules of interest selected from said MHC, antigen, accessory molecule, co-stimulatory molecule, cell modulation molecule, adhesion molecule, and irrelevant molecule components, said molecules for orienting further in contact with at least said liposome components.

329. An artificial antigen presenting cell according to claim 328 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

330. An artificial antigen presenting cell according to claim 329 wherein a label contacts at least one of a lipid bilayer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory components, said cell modulation molecule components, said adhesion molecule components, said irrelevant molecule components, said cholesterol components, and said accessory components.

331. An artificial antigen presenting cell according to claim 330 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

332. An artificial antigen presenting cell according to claim 329 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

333. An artificial antigen presenting cell according to claim 329 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

334. An artificial antigen presenting cell according to claim 329 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to ligands of the foregoing molecules.

335. An artificial antigen presenting cell according to claim 329 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

336. An artificial antigen presenting cell according to claim 329 wherein said cell modulation molecule components are selected from the group consisting of a cytokine, a chemokind, CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

337. An artificial antigen presenting cell according to claim 329 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

338. An artificial antigen presenting cell according to 329 wherein said irrelevant molecule components, have a chemical moiety for binding a solid support either directly or through an intermediate molecule, or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

339. An artificial antigen presenting cell according to claim 338 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture molecules further having the capacity to bind specifically to said irrelevant molecule components.

340. An artificial antigen presenting cell according to claim 339 wherein said capture molecules are noncovalently bound to said lipid.

341. An artificial antigen presenting cell according to claim 329 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

342. An artificial antigen presenting cell comprising:

a) solid support components;

b) liposome components;

c) MHC components;

d) antigen components;

e) accessory molecule components, wherein said solid support components comprise a glass or magnetic spheroid, said liposome components are contacted either covalently or noncovalently with said solid support components, said antigen components are in contact with at least said MHC components, and;

f) molecules for orienting molecules of interest, said molecules of interest selected from said MHC, antigen, and accessory molecule components, said molecules for orienting in contact with at least said liposome components.

343. An artificial antigen presenting cell according to claim 342 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

344. An artificial antigen presenting cell according to claim 343 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

345. An artificial antigen presenting cell according to claim 344 wherein a label contacts at least one of a lipid layer of said liposome component, a lipid of said liposome component, said antigen, said MHC, and said accessory components.

346. An artificial antigen presenting cell according to claim 345 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

347. An artificial antigen presenting cell according to claim 344 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

348. An artificial antigen presenting cell according to claim 344 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

349. An artificial antigen presenting cell according to claim 344 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to the ligands of the foregoing molecules.

350. An artificial antigen presenting cell according to claim 344 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin $\beta$ subunit.

351. An artificial antigen presenting cell according to claim 342 further comprising molecular components selected from the group consisting of co-stimulatory molecule components, adhesion molecule components, cell modulation molecule components, irrelevant molecule components for binding said artificial presenting cell to a solid support or binding a label, and label components.

352. An artificial antigen presenting cell according to claim 351 wherein said molecules of interest further selected from the group consisting of said molecular components of claim 351.

353. An artificial antigen presenting cell according to claim 352 wherein said liposome components comprise a lipid, said lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine.

354. An artificial antigen presenting cell according to claim 353 further comprising a surfactant component wherein said surfactant component is cholesterol in contact with at least said liposome components.

355. An artificial antigen presenting cell according to claim 354 wherein a label contacts at least one of a lipid layer of said liposome components, a lipid of said liposome components, said antigen components, said MHC components, said co-stimulatory molecule components, said adhesion molecule components, said cell modulation molecule components, said molecules for orienting, said irrelevant molecule components and said accessory components.

356. An artificial antigen presenting cell according to claim 355 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

357. An artificial antigen presenting cell according to claim 354 wherein said molecules for orienting are selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subuint.

358. An artificial antigen presenting cell according to claim 357 wherein said molecules of interest contact at least one of said molecules for orienting of claim 357.

359. An artificial antigen presenting cell according to claim 354 wherein said antigen is selected from the group consisting of a peptide, a peptide derived from a recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

360. An artificial antigen presenting cell according to claim 354 wherein said MHC components are selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

361. An artificial antigen presenting cell according to claim 354 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to the ligands of the foregoing molecules.

362. An artificial antigen presenting cell according to claim 354 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

363. An artificial antigen presenting cell according to claim 354 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

364. An artificial antigen presenting cell according to claim 354 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

365. An artificial antigen presenting cell according to 354 wherein said irrelevant molecule components have a chemical moiety for binding a solid support either directly or through an intermediate molecule or for binding a label, said solid support further selected from the group consisting of a glass bead from 25 to 300 μm diameter, and a magnetic bead from 25 to 300 μm diameter.

366. An artificial antigen presenting cell according to claim 365 wherein said solid support is coated with a lipid selected from the group consisting of a phospholipid, a neutral phospholipid, and phosphotidylcholine, said solid support further having capture molecules, said capture molecules further having the capacity to bind specifically to said irrelevant molecule.

367. An artificial antigen presenting cell according to claim 366 wherein said capture molecules are noncovalently bound to said lipid.

368. A method of making an artificial antigen presenting cell comprising:

(a) obtaining an MHC:antigen complex of interest;

(b) contacting said MHC:antigen complex with a lipid and cholesterol and forming a lipid membrane-associated MHC:antigen complex; and

(c) contacting said membrane-associated MHC:antigen complex resulting from step (b) with a molecule for orienting molecules of interest, and molecules of interest, wherein said molecules of interest comprise at least one of molecules selected from the group consisting of an accessory molecule, a co-stimulatory molecule, a cell modulation molecule, an adhesion molecule, an irrelevant molecule, cholesterol, and a label.

369. A method according to claim 368 wherein steps (b) and (c) are performed simultaneously.

370. A method according to claim 369 wherein said MHC components is selected from the group consisting of a natural MHC, a recombinant MHC having sufficient composition for binding an antigen, an $\alpha 1$ and $\alpha 2$ subunit set of a Class I MHC, an $\alpha 1$ and $\beta 2$ subunit set of a Class II MHC, a peptide derived from said $\alpha$ and $\beta$ subuits, and a portion of a natural MHC having sufficient composition for binding an antigen.

371. A method according to claim 369 wherein said antigen is presented by an MHC components for contact with and recognition by a T cell receptor, said antigen selected from the group consisting of a peptide, a peptide derived from the recipient for graft versus host diseases, a cancer cell-derived peptide, a peptide derived from an allergen, a donor-derived peptide, a pathogen-derived molecule, a peptide derived by epitope mapping, a self-derived molecule, a self-derived molecule that has sequence identity with said pathogen-derived antigen, said sequence identity having a range selected from the group consisting of between 5 and 100%, 15 and 100%, 35 and 100%, and 50 and 100%.

372. A method according to claim 369 wherein said accessory molecule components are selected from the group consisting of LFA-1, CD11a/18, CD54(ICAM-1), CD106(VCAM), CD49d/29(VLA-4), and antibodies to the ligands of the foregoing molecules.

373. A method according to claim 369 wherein said co-stimulatory molecule components are selected from the group consisting of B7-1, B7-2, CD5, CD9, CD2, CD40 and antibodies to their ligands.

374. A method according to claim 369 wherein said cell modulation molecule components are selected from the group consisting of CD72, CD22, CD58, anti-CD22, anti-CD58, anti-CD72, anti-cytokine receptor, and anti-chemokine receptor.

375. A method according to claim 369 wherein said adhesion molecule components are selected from the group consisting of ICAM-1, ICAM-2, GlyCAM-1, CD34, anti-LFA-1, anti-CD44, anti-beta7, chemokines, CXCR4, CCR5, anti-selectin L, anti-selectin E, and anti-selectin P.

376. A method according to claim 369 further comprising contacting a label with at least one of a lipid layer of said liposome components, a lipid of said liposome components, antigen components, MHC components, co-stimulatory molecule components, adhesion molecule components, cell modulation molecule components, GM-1, cholera toxin β subunit, irrelevant molecule components and accessory components, said contacting said label performed in step (c).

377. A method according to claim 376 wherein said label is selected from the group consisting of biotin, vancomycin, a fluorochrome, FITC, and a radiolabel.

378. A method according to claim 369 wherein said molecules for orienting is selected from the group consisting of GM-1, a pentasaccharide, a ganglioside, and cholera toxin β subunit.

379. A method according to claim 378 wherein said GM-1 contacts at least said liposome components.

380. A method according to claim 379 wherein said cholera β subunit contacts at least one of said co-stimulatory molecule components, adhesion molecule components, cell modulation molecule components, irrelevant molecule components, and said accessory components and further contacts at least said GM-1.

Remarks

Applicants wish to thank the Examiner for taking the time to meet with Applicant June 26, 2001, in an in-person interview to discuss various aspects of this application. Applicant believes that this interview will facilitate the Examiner's understanding of the invention and immunological subject matter related thereto. Applicants address certain issues respecting the interview below.

1. With respect to the amendment to the specification, Applicant requests that the word "protein" be deleted from all instances where the word is used in relation to the word "GM-1". Applicants respectfully bring to the Examiner attention that GM-1 is a ganglioside that is also a